AMENDMENTS TO THE CLAIMS:

Please cancel claims 21-28. This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (original) A method for monitoring the composition of a fluid flowing through a vessel which comprises the steps of:

(a) applying a continuous periodic acoustical signal to the outside of the vessel such that the acoustical signal is transferred to the flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein;

(b) detecting the vibrational features generated in the flowing liquid;

(c) sweeping the continuous periodic acoustical signal through a chosen frequency range which includes two chosen consecutive maxima among the vibrational resonance features; and

(d) measuring the frequency difference between the two chosen consecutive maxima of the flowing fluid.

2. (original) The method as described in claim 1, further comprising the step of determining the full-width-at-half-maximum of at least one of the two chosen consecutive resonance features.

3. (original) The method as described in claim 1, further comprising the step of determining the acoustic impedance of the fluid.

4. (original) The method as described in claim 1, further comprising the step of determining the ratio of the resonance feature minimum to the resonance feature maximum .

5. (original) An apparatus for monitoring the composition of a fluid flowing through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said vessel for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein;

(b) a second transducer in acoustic contact with the outside of said vessel and located on the side thereof opposite to said first transducer for detecting the vibrational resonance features generated in the flowing liquid;

(c) a sweep generator for sweeping said first transducer through a chosen frequency range which includes two chosen consecutive maxima among the vibrational resonance features; and

(d) a data processor for determining the frequency difference between the two chosen consecutive maxima of the flowing fluid.

6. (original) The apparatus as described in claim 5, wherein said data processor determines the line width of at least one of the two chosen consecutive resonance features.

7. (original) The apparatus as described in claim 5, wherein said data processor determines the acoustic impedance of the fluid.

8. (original) The method as described in claim 5, wherein said data processor determines the ratio of the resonance feature minimum to the resonance feature maximum.

9. (original) An apparatus for monitoring the composition of a fluid flowing through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said pipe for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein, and for detecting the generated vibrational resonance features;

(b) a sweep generator for sweeping said first transducer through a chosen frequency range which includes two chosen consecutive maxima in the vibrational resonance features; and

(c) a data processor for recording the frequency difference between the two chosen consecutive maxima of the flowing fluid.

10. (original) The apparatus as described in claim 9, wherein said data processor determines the line width of at least one of the two chosen consecutive resonance features.

11. (original) The apparatus as described in claim 9, wherein said data processor determines the acoustic impedance of the fluid.

12. (original) The apparatus as described in claim 9, wherein said data processor determines the ratio of the resonance feature minimum to the resonance feature maximum.

13. (original) An apparatus for monitoring the composition of a fluid flowing through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said vessel for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein;

(b) a second transducer in acoustic contact with the outside of said vessel and located on the same side thereof as said first transducer and in the vicinity thereof, for detecting the vibrational resonance features generated in the flowing liquid;

(c) a sweep generator for sweeping said first transducer through a chosen frequency range which includes two chosen consecutive maxima among the vibrational resonance features; and

(d) a data processor for determining the frequency difference between the two chosen consecutive maxima of the flowing fluid.

14. (original) The apparatus as described in claim 13, wherein said data processor determines the line width of at least one of the two chosen consecutive resonance features.

15. (original) The apparatus as described in claim 13, wherein said data processor determines the acoustic impedance of the fluid.

16. (original) The apparatus as described in claim 13, wherein said data processor determines the ratio of the resonance feature minimum to the resonance feature maximum.

17. (original) A method for monitoring the flow rate of a fluid through a vessel which comprises the steps of:

(a) applying a continuous periodic acoustical signal to the outside of the vessel such that the acoustical signal is transferred to the flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein;

(b) detecting the vibrational resonance features generated in the flowing liquid;

(c) sweeping the continuous periodic signal through a chosen frequency range which includes two chosen consecutive maxima in the standing-wave vibrational pattern;

(d) recording the frequency difference between the two chosen consecutive maxima to determine whether the composition of the fluid has changed;

(e) correcting the location of the resonance peaks in response thereto; and

(f) determining the frequency of one of the chosen resonance peaks, such that the flow rate of the fluid is determined.

18. (original) An apparatus for monitoring the flow rate of a fluid through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said vessel for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein;

(b) a second transducer in acoustic contact with the outside of said vessel and located on the side thereof opposite to said first

transducer for detecting the vibrational resonance features generated in the flowing liquid;

(c) a sweep generator for sweeping said first transducer through a chosen frequency range which includes two chosen consecutive maxima in the standing-wave vibrational pattern; and

(d) a data processor for recording the frequency difference between the two chosen consecutive maxima to determine whether the composition of the fluid has changed, for correcting the location of the resonance peaks in response thereto, and for determining the frequency of one of the chosen resonance peaks, such that the flow rate of the fluid is determined.

19. (original) An apparatus for monitoring the flow rate of a fluid flowing through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said pipe for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein, and for detecting the generated vibrational pattern;

(b) a sweep generator for sweeping said first transducer through a chosen frequency range which includes two chosen consecutive maxima in the vibrational resonance features; and

(c) a data processor for recording the frequency difference between the two chosen consecutive maxima of the flowing fluid to determine whether the composition of the fluid has changed, for correcting the location of the resonance peaks in response thereto, and for determining the frequency of a chosen resonance peak, such that the flow rate of the fluid is determined.

20. (original) An apparatus for monitoring the flow rate of a fluid through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said vessel for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein;

(b) a second transducer in acoustic contact with the outside of said vessel and located on the same side thereof as said first transducer and in the vicinity thereof, for detecting the vibrational resonance features generated in the flowing liquid;

(c) a sweep generator for sweeping said first transducer through a chosen frequency range which includes two chosen consecutive maxima in the standing-wave vibrational pattern; and

(d) a data processor for recording the frequency difference between the two chosen consecutive maxima to determine whether the composition of the fluid has changed, for correcting the location of the resonance peaks in response thereto, and for determining the frequency of a chosen resonance peak, such that the flow rate of the fluid is determined.

21-28. (cancelled)

29. (original) A method for monitoring the flow rate of a fluid having a composition and flowing through a vessel which comprises the steps of:

(a) applying a continuous periodic acoustical signal to the outside of the vessel such that the acoustical signal is transferred to the flowing fluid, thereby generating vibrational resonance features;

(b) detecting the vibrational features generated in the flowing liquid;

(c) sweeping the continuous periodic acoustical signal through a chosen frequency range which includes a portion of one vibrational resonance feature;

(d) measuring the phase of the vibrational resonance feature relative to that for the continuous periodic acoustical signal generating thereby a phase difference;

(e) determining the composition of the fluid; and

(f) correcting the phase difference for the composition of the fluid, whereby the flow rate of the fluid is determined.

30. (original) An apparatus for monitoring the flow rate of a fluid having a composition and flowing through a vessel which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said pipe for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein, and for detecting the generated vibrational pattern;

(b) a sweep generator for sweeping said first transducer through a chosen frequency range which includes a portion of one vibrational resonance feature;

(c) means for measuring the phase of the vibrational resonance feature relative to that for the continuous periodic acoustical signal generating thereby a phase difference;

(d) means for determining the composition of the fluid; and

(e) a data processor for recording the phase difference and correcting the phase difference for the composition of the fluid, whereby the flow rate of the fluid is determined

31. (original) A method for monitoring the composition of a fluid flowing through a vessel at a flow rate which comprises the steps of:

(a) applying a continuous periodic acoustical signal to the outside of the vessel such that the acoustical signal is transferred to the flowing fluid, thereby generating vibrational resonance features;

(b) detecting the vibrational features generated in the flowing liquid;

(c) sweeping the continuous periodic acoustical signal through a chosen frequency range which includes a portion of one vibrational resonance features;

(d) measuring the phase of the vibrational resonance feature relative to that for the continuous periodic acoustical signal generating thereby a phase difference;

(e) determining the flow rate of the fluid; and

(f) correcting the phase difference for the flow rate of the fluid, whereby changes in the composition of the fluid are identified.

32. (original) An apparatus for monitoring the concentration of a fluid flowing through a vessel at a flow rate which comprises in combination:

(a) a first transducer in acoustic contact with the outside surface of said pipe for applying a continuous periodic acoustical signal to the outside of said vessel such that the acoustical signal is transferred to said flowing fluid, thereby generating vibrational resonance features having a plurality of maxima and minima therein, and for detecting the generated vibrational pattern;

(b) a sweep generator for sweeping said first transducer through a chosen frequency range which includes a portion of one vibrational resonance feature;

(c) means for measuring the phase of the vibrational resonance feature relative to that for the continuous periodic acoustical signal generating thereby a phase difference;

(d) a flow meter for determining the flow rate of the fluid; and

(e) a data processor for recording the phase difference and correcting the phase difference for the composition of the fluid.